NATIONAL CAPITAL CHAPTER

BMWCCA

WASHINGTON, D.C.

DER BAYERISCHE

Volume III No. 9 September 1973

OFFICIAL PUBLICATION OF
BMW Car Club of America / National Capital Chapter

DER BAYERISCHE

P.O. Box 2413

Hyattsville, Md. 20784

Editors . . . . . Ric & Patti Cavallero
(301) 577-8768
Cover . . . . . Rick Price
Staff . . . . . Dave Roach Mike Leeper
Nancy Stutsman Brian Hollen

BMWBMWBMWBMWBMWBMWBMWBMWBMWBMWBMWBMWBMWBMWBMWBMWBMW

NATIONAL CAPITAL CHAPTER
OFFICERS

President . .	Mike Leeper . . .	(703) 491-3038
V. Pres. . .	Malcolm Stephens .	(301) 490-4915
Secretary . .	Suzie Wyban . . .	(703) 979-5733
Treasurer . .	Paul MacInnis . .	(301) 449-6599

BMWBMWBMWBMWBMWBMWBMWBMWBMWBMWBMWBMWBMWBMWBMWBMWBMW

COMMITTEE CHAIRMEN

Activities . .	Paul Lentz	(301) 345-3581
Autocross . .	Chet Kingsbury . .	(301) 345-2915
Rally	Fred Ipavich . . .	(301) 779-2175
Technical . .	Ed Alber	(703) 527-6879
Council . . .	Chris Romine . . .	(301) 577-7613
Racing . . .	Jerry Coffey . . .	(202) 223-9194
Membership . .	Patti Cavallero. .	(301) 577-8768
Serv. Rpts. .	Mel Morganstein. .	(301) 384-5858
Storekeeper. .	John Coon.	(703) 941-3329

DER BAYERISCHE is a monthly publication of the National Capitol Chapter of the BMW Car Club of America, Inc., and is provided by and for the members of the BMW Car Club of America only. The ideas, opinions, and suggestions expressed in regard to technical matters are those of the authors and no authentication is implied by the editors. Modifications within the warranty period may void the warranty.

$4.50 of the annual chapter membership dues is for a subscription to DER BAYERISCHE. *Single copy price is $ .40.*

Ed. Note

Since we have quite a few good articles to help fill the pages of this rag I will not waste too much of this percious paper by rambling about relatively insignifate matters. The few items I want to discuss are the upcoming elections. Give some thought about either holding an office or a chairman's post. If your interested, call Paul MacKinnis.

Secondly, for the upcoming year the club will need a new editor for Der Bayerische.. This job does not require as much as one might imagine. Myself and Patti plan to remain on the staff along with, hopefully, the rest of our staff. The main duties of the editor will be to collect the articles, proof read them and direct the staff in their formation.

He will also be responsible for delivery and pick-up with the printer and with mailing, unless he's smart and awards these tasks to other unsupecting members.

Lastly, I just want to encourage all, to plan to attend OKTOBERFEST '73. It should be the greatest club event to date. Read more in the O'fest article elsewhere in this issue.

Ric Cavallero

From The Driver's Seat

In the last issue you found various articles on the 1973 Chapter Congress held in beautiful (?) Brookville, Pa. I'd like to devote this column to some impressions of the meeting. These are highly subjective, of course, and should be regarded in that light.

Various sources have described the '72 Congress as something of a shambles, with dissatisfaction and argument as the keynotes; I wasn't there, so I can't vouch for the accuracy of these reports although it seems reasonable to assign them a large dose of credibility, considering the state of local-national relations at that time.

This year, though, the mood seemed to be one of cooperation. There wasn't any open rivalry among chapters, and, although there were complaints, there was no feeling of general animosity toward the national officers. Everyone seemed to be content with voicing problems and trying to iron them out. There was no emphasis on fault-finding or blame-laying. Consequently, a lot was accomplished, as you saw from the reports.

This is not to say there was no disagreement. Lots of items--many of them raised by National Capitol Chapter--were controversial. There were more proposed solutions than there were problems. People became testy at times as authorities and sensibilities were challenged. But this is to be expected, and the healthy amount of discussion and proposal demonstrated that the delegates had all done their homework on problems that concerned us all.

The sessions generally proceeded well, largely due to the efforts of Parker Spooner, who came to the Congress determined to keep things on an even keel. His job was easier than he had expected. I was really impressed with the the spirit in which business was conducted and ideas were discussed, as well as with the genuine interest expressed by all parties, national officers included. This bodes well for the future of what is going to be one of the largest automobile clubs in this country.

Mike Leeper

Minutes

Mike Leeper called the meeting to order at 8:10 p.m.

The minutes of the July meeting were approved as published in the newsletter.

Chet Kingsbury gave the autocross report. He is still hoping to have an autocross school in conjunction with the University of Maryland Sports Car Club but has to wait until they are back in school before he can arrange it.

Fred Ipavich gave the rally report and discussed the coming Mad Hatter Rally. Ric Cavallero mentioned the Morgan Car Club's Octoberfest rally.

Ric gave the Council report and stated that anyone who is interested in autocrossing or rallying next year should watch for the Open meeting to discuss the new Council rules. Bill has offered the use of his school to council clubs at a very good rate.

Jerry Coffey gave the racing report and noted that the BMW's are now sporting new spoilers.

Ric stated that the new membership list is now available.

Ed Alber announced that the tech session had been rained out but that a new date would be set.

Mel Morganstein discussed the service reports.

Ric asked that anyone who could contribute to Der Bayrische for September should do so as this is the issue the national newsletter contest will be based on.

OLD BUSINESS: September 15 is the deadline for preregistration (at a saving). Again this year there will be a raffle for a Bavaria--see the ROUNDEL.

NEW BUSINESS: Per action at the last Council meeting, Ric made a move to ban a certin indicidual from one year's competition in any and all Council-sanstioned autocross. This was proposed because of his behavior at an autocross at Landover Mall. This was seconded. Discussion followed. This was passed. Mel then moved that we recommend that he be banned permanently. This was

passed. It was moved that the Council be asked to send a letter of appreciation to the individual who was assaulted. This was passed.

Jerry Coffey announced that D.C. paid for the suspension A-arm which was bent during a D.C. inspection. The recommendation he made for going through D.C. inspection is to go in and advise the personnel in the inspection line that this is a BMW and should not be jacked up. Be very firm and they will not jack it up.

Suzie Wyban

Member Memorabilia

Hi!! It's me again. Why not help me welcome our new members? Get to know them, make them feel like part of the club. The following people just joined the ranks:

Jeff Niklaus of 11204 Deborah Drive, Potomac, Md., owns a 1965 1800.

John Jenrick, who drives a 1972 2002 tii, lives at 2032 Royal Fern Ct., Reston, Va.

William Riblett comes to us from 11736 Cherry Grove Dr., Gaithersburg, Md. Unfortunately, Bill did not say what model BMW he has....

Kent Fixman owns a brand new 1973 2002. Kent will be driving to our events from his home at 2445 Lyttonsville Rd., Silver Spring, Md.

Michael Sullivan, 9210 Farnsworth Ct., Potomac, Md., owns a 1967 2002.

Michael & Linnea Turner (Hey, that makes two Mike Turners in the club now!) who live at 6103 Clearbrook Dr., Springfield, Va., drive a 1970 2002A.

Guy and Rosemarie Larreur, who are already members of the National, come to us from 5212 Lynngate Rd., Columbia, Md. The Larreurs own a 1972 Bavaria.

Welcome.... life, love, and happiness to you all.

If you are interested in getting to know the rest of the membership, plan to attend the new members get-together on Saturday, Oct. 6.

Patti Cavallero

Rally Corner

These are the upcoming rallies: Morgan Car Club Cherrished date rally on September 30, Branded's Cherished date rally on October 7, and PCA's "Autumn Color" Championship rally on October 21.

A few rallies are now including unequipped classes. Presently there are four classes recognized by the Council. They are: MASTER (greater than 36 points), EXPERT (15 to 35 points), SENIOR (4 to 14 points), and NOVICE (0 to 3 points). 1 point is awarded for each trophy won in the previous 36 months, 6 points for any 1st, 2nd, or 3rd overall finish on a Championship rally and 12 points for any overall finish on a national rally. There have been a number of suggestions as to how to incorporate unequipped classed into the present 4-class system. For example, the MCC rally on September 30 will have

4 classes: Master-Expert, Senior equipped, Senior unequipped, and Novice. Sesca's "Madhatter" rally (Sept. 9) has 7 classes: the 4 council classes plus 3 unequipped classed (no points, 1-8 points, and greater than 8 points).

Steve Butler has proposed a 6-class system with 3 equipped and 3 unequipped classes, the classes being 0-8points, 9-20 points and greater than 20 points. Rich Lieberman has also proposed a 6-class system: Master (regardless of equipment), Expert equipped, Expert unequipped, Senior equipped, Senior unequipped, and Novice (all run unequipped). Finally, Jack Fawsett has suggested a 9-class system: the four Council classes equipped & unequipped, and a beginner class (no points).

The actual class system adopted next year will no doubt be heavily influenced by the success fr failure of the systems presently being tried. However, there is little doubt that some type of class system incorporating unequipped classes will be standardized for next year's rally season.
POR...

Fred Ipavich

Novice Rallying--
A Guide for the Compleat Idiot

Being a novice rallyist requires a unique idea of how to spend a sunny Sunday. If you enjoy relaxing around the house, taking a dip in the pool, or napping the afternoon away, you probably won't enjoy rallying. If, however, you enjoy driving wildly down country roads while trying to figure out exactly what some logical genius (called a "Rallymaster") means by phrases such as "If you go right at T, you won't go left; if you go left, you won't go wrong," then rallying is for you.

The first thing to do as a novice rallyist is to get some idea of the way rallies are conducted. To do this, you need two things: a copy of the MWCSCC championship rally rules (almost all time-speed-distance rallies are conducted according to these rules) and an experienced rallyist to explain these and the general instructions to you. It also helps to attend some sort of beginning rallyist's school, if there is one available. It is essential to know the exact definitions of "Stop," "T," "Pick up," "Railroad Tracks," and so forth as they are defined in the rules. In the rulebook you can also find out how course-following priorities and checkpoints work and what overlaps, transit zones, and margin mileages are. On my first rally, for instance, I had not read the rulebook, and hence we took many failsafes, got completely off course several times, and gave up shortly after the afternoon run began. Being so confused that you give up is very disheartening.

Perhaps the best type of rally to go on for your first rally is something along the lines of a Friday night rally or a cherished date rally. These tend to be shorter and a little simpler than a championship--most Friday nighters are 60-80 miles (2-3 hours) and most cherished date rallies are around 100 miles long (3-4 hours) as opposed to championships, which tend to run from 150-250 miles and take all day (including two breaks and lunch, of course). As soon as you feel as if you know how a rally works, however, you should try your hand at running a championship--they're difficult, of course, but nowhere else can you learn as much about traps and failsafes as you can on a championship rally.

Before setting out for the start of your first rally, read, mark, learn, and inwardly digest the general instructions very carefully. It is very helpful for both driver and navigator to sit down and go over them together, preferably with a more experienced rallyist sitting in. (Most experienced rallyists spend their evenings at home because they've been ostracized by all possible dates, friends, and neighbors for talking incessantly about rallying, and they generally have no money to spend on

entertainment because they've just taken out a second mortgage in order to but the latest $900 rally computer, so they'll be delighted to come over for a few [dozen?] drinks and a discussion of the generals.)

The starting point of the rally is your first test of nerves and skill. If you arrive sufficiently early, you'll have to nonchalantly walk past cars with their dashboards covered with lead-crystal digital readouts, switches, and hundredth-reading odometers. If at all possible, ignore all of this equipment, since most of it belongs to experts and masters. Chances are, any novices you run across that have computers either do not know how to use them or else do not know how to follow the course. The few equipped novices that do know what they're doing will probably move up to senior class by the next rally anyway.

Somewhere on the parking lot at the start will be a radio tuned to CHU Canada or WWV. Proceed to this spot, and ignore the half-dozen or so people with Heuer split-action chronographs. Wind your watch and set it so Mickey's long arm points to the right minute, find out how far your second hand is off, and walk away--you'll probably only look at it a few times anyway.

When your time to start comes, run out the odo leg as quickly as possible, check your odometer by percentage, shut off the motor at a convenient stopping place, and read ahead in the route instructions. Pick out what appear to be tricky instructions and try to figure out what they are going to mean. For instance, if you come across an instruction that reads "Pause .50 seconds at '298'," you'll know in advance that you can ignore the instruction when you get to it, whereas if you suddenly come across it in the heat of competition you may very well misread it as "Pause .50 minutes." When your time to leave the end of the odo leg comes, start being very logical and careful. For the first few rallies, it is best to not get worried about rally speeds and time--just go between five and ten miles per hour above the speed called for and concentrate on course following. Keep track of exactly what items you need to execute the instructions you're working on and concentrate only on them. At each intersection where your course is not clear, pause long enough to go through the course-following priorities in order to determine which way you should go. If you get off course, or if you realize you bought a trap (I usually realize that I've bought a trap, when I do realize it at all, about a mile past the intersection), turn around and go back and try to figure it out. You may lose time, but you'll be learning.

When you become more familiar with rallying and the other contestants involved you can participate in a slightly immoral procedure called master following. When you know what Mike and Kathy Leeper's car looks like and you happen to see them in front of you, you may follow them at a safe distance, but when they turn or speed up or slow down, make sure you know why they did it. Anyway, for the first few rallies, make a point of not following anyone; you may follow that professional-looking Porsche inffront of you for four or five miles only to discover that they've taken the advice of their own bumper sticker: "Discover America--Get Lost on a Rally."

If you really blow it and wind up taking a half-hour off-course excursion (and we all do this occasionally), chances are you'll come into the next checkpoint after it's closed. If the checkpoint people have everything packed up and are ready to leave, there's not much point in stopping. If they're still more or less set up, you can probably elicit enough sympathy to get a leg review slip if nothing else. In any case, ignore all speeds and pauses for the next leg; if you make it to the next checkpoint while it's still open you'll get an automatic zero anyway, so it doesn't matter if you get in half an hour early. In fact, it's a good idea to get in early so you'll

have some time to blow it again on the next leg.

Above all, never lose your confidence. Even if you've taken every failsafe because you just knew you didn't see that sign you were looking for, don't assume you missed an important sign toward the end of the rally. Rallymasters have a sadistic love for getting in that last little turn of the screw by having you look diligently for some sign that doesn't exist.

At the finish, sit down with a drink (you'll need one) and your rally-veteran friend and discuss the failsafes you bought. Listen carefully to what you did wrong, and file it away for future reference. If by some fluke you did something right, quickly find someone who did it wrong and proudly expound on how he messed up.

David Roach

-------Picnic Rally-------

The second annual Picnic Rally was great fun for all who participated. Some regret was felt by this writer due to lack of more participation in the rally. Perhaps many folks are not interested in an easy fun rally with a good gathering of common interest friends at the end, but enough people were to make it enjoyable.

Seven cars ran the rally out to the Flying Circus Aerodrome and enjoyed their food plus the beer and watermelon supplied by the club. The show, sadly, was lacking the zip that it had last year, although we were assured by the owners that it had changed for the better. It didn't. Next year we can promise a new site for completion of the rally...any suggestions?

Due to timing error at √· 3 the scores announced on the day of the rally were erronious. The official scores are as follows;

].	Jensen & Jensen	334
2.	Almary & Rogers	385
3.	Wyban & Wyban	432
4.	Freedman & Smith	476
5.	Shima & Arthur	5]2
6.	Hawk & Hawk	805
7.	McGregor & Hildebrand	DNF

Trophies will be awarded when we get them.

Brian Hollen

O'fest"73"

Oktoberfest '73 is coming. If you have never been to a BMWCCA Oktoberfest, you have missed a perfectly enjoyable weekend. It's a gathering of BMWCCA members from all chapters, gathering together to show, compete, and talk BMWs. It's

also a time to meet new people and get together with old friends. Be part of it! New faces this year will be old friends next year.

Oktoberfest '73 is hosted by the New Jersey chapter and will be held in Atlantic City, New Jersey. The drive is not long and the trip will take you on smaller state roads, the type that you and your BMW enjoy. A caravan will be formed for the drive to Atlantic City on Friday night. More details on this in the next newsletter.

The event will be held October 19 thru 21. Activities include: autocross, rallies, concours, party, awards banquet. Preregistration ends September 22. Registration fees are: $25/single, $40/couple (by Sept. 22); $30/single, $45/couple (after Sept. 22). Prices include entry in all events, beerfest, awards banquet, and Saturday night's party. All in all, it should be a super-good time. Additional details are in this month's Roundel. See you there.

Brian Hollen

Racing Here & There

A Personal Opinion

The race at Spa was marred by several disastrous accidents -- one of which involved the Alpina CSL driven by Joisten. He was in second place and was driving very aggressively through the large field of slower GP 1 cars. He was passing cars wherever he encountered them and some of the passes were described by observers as "hair-raising". In attempting to pass the GP 1 Alfa of Roger Dubos, Joisten lost control, left the track, and hit the armco. The speed differential was so great that Joisten's car rebounded across the track and collided with the same Alfa. Both drivers died of their injuries.

Observers blamed the crash on driver error but that can't end the discussion. Drivers will always make some errors. A driver who makes a mistake deserves to lose some positions, DNF, or sometimes write off his car, but he doesn't deserve to die. Spa has been extracting its bitter toll for years. The GPDA refuses to race there in spite of cries of "It's safe enough for sedan racing..." Now it seems the GPDA was right and the machismo freaks were wrong. Most tracks all over the world have recognized the need for safer facilities and race formats. It is past time to shut down the killer races -- the Indys and the Spas -- before someone or a lot of someones decide to shut down the whole sport.

The Bavarian Airplane

No, it's not a new rock group, though it certainly rocked the Ford tropps at the Nurburgring. The attitude in the Capri camp was summed up by E. Fittipaldi who complained that he had come to drive against automobiles, not airplanes. The car that caused the commotion was the new rebodied CSL.

Actually 95% of the bodywork is unchanged but the remaining 5% is a bit more than the usual bolt-on spoilers. The nose treatment is similar to the Le Mans nose but the spoiler is as far forward as possible to allow the sides to curve gently back to the wheel openings. And the entire spoiler is flared into the normal bodywork at the top.

The effect of the nose is to force almost all the low frontal air around the sides of the car. This flow is assisted by long airflow fences along the peak of the front fender line. These fences prevent air flowing up the hood from spilling over the sides until it is past the bulge of the fender flares.

Of course all this front end cleanup has the effect of moving the center of pressure forward which causes instability

at high speeds. To neutralize this the rear deck has grown a pair of moderate fins along the fender peaks and between the fins about 10 inches above the deck lid is a genuine, functional wing. To make the low mounted wing work, a slot spoiler has been added to the rear edge of the roof. This device delays separation of the air coming off the foof and directs it down over the wing.

What's it all worth? About 8-15 seconds a lap at the Nurburgring or 20 horsepower depending on your choice of comparisons. The Amon-Stuck car picked up 15 seconds a lap in testing when the wing was added and qualified 8 seconds ahead of the Hezemans-Questor car fitted only with the Monza spoiler. It was only 3 seconds behind the Lauda-Joisten Alpina which is now using the 3.5 liter engine (about 380 HP). Schnitzer is also using the big engine, but their less sophisticated chassis put them at a severe disadvantage at this track.

In the race the factory Capris self-destructed leaving the "airplane" with the win. Hezeman-Questor were second and Lauda-Joistens third after some problems The highest placed Capri was a private entry in fifth place overall, so BMW gained a 70 to 65 lead in Division 2.

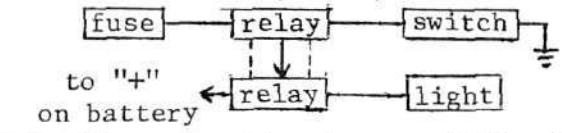
After the fantastic results from the Nurburgring tests, BMW Motorsport knocked out 100 wings in very short order, so that by the Spa 24 hours most of the major BMW teams had the full bodywork mods. Even the private Belgian entrants had wings. And the qualifying times were amazing. The four-minute barrier was shattered, Amon-Stuck getting down to 3:49.1. The fastest Capri was fifth on the grid with a time of 3:57.6. The seventh and last GP1 CSL was in ninth spot on the grid.

The first four cars from Alpina and the factory swapped the lead for nine hours until Hezeman and Questor took over for good in the tenth. They pulled steadily away as the others dropped out to win by about 130 miles over the Mass-Fitzpatrick Capri. During the 23rd hour, they led by over an hour and sprinted for a while as Mass tried to get one lap back, but more diplomatic heads took charge and they coasted (or should I say "taxied") to an impressive win. A GP1 320 CSL placed fourth overall splitting the very strong GP1 Opel team.

Jerry Coffey

Technical Trivia

Several people have asked me about hooking up lights and radios. If you have a later model with 12 fuses instead of 6, BMW has made it easy for you. Later I'll cover the six-fuse models. The wiring uses spade clips almost exclusively throughout the car. The spade clips are all the same size. The take-off for lights and radio is on the back of the fuse box. Remove the clear plastic cover and the single phillips screw. Carefully lift out and turn over without pulling the wires loose. You'll see it's all color coded. This hookup is for the low amperage side of the relay, the one with the switch in circuit, i.e.,



Make the connection to one of the three grey-green terminals. This will allow the fog (driving) lamps to turn off with the parking lights (as is required in most states).An entire fuse should be added to wire driving (fog) lights with the high beam on. There is a terminal near the battery in the wiring harness with three black leads. This has power when the high beam is on. It should have an in-line fuse.

The radio is a lot simpler. For a radio that must be manually turned off, use a red-yellow terminal. If you wish the radio to turn off when you lock the steering but stay on the rest of the time, including when it is in the

second off position (steering not locked), there is a terminal on the end of a small violet wire somewhere under the dash near the key lock.

The older cars with six fuses can use the "R" terminal on the key lock; it should be the only blank terminal. Disconnect the battery before working with these wires because there are several live wires that can short out to ground. For fog and driving lights you must remove the instrument cluster, then remove the light switch, terminal 30. If your car is pre-'69 and the parking lights go off when the headlights go on, remove the grey-black wire from 57 and put it on terminal 58R or 58 L. Good luck!

Ed Alber

Gear Lubricants and Motor Oils

This article is an attempt to explain some basic concepts about automotive lubricants. For example, what does it mean if the oil you buy has "10W40" stamped on the container? Well, it means the oil has a viscosity between 6,000 and 12,000 Saybolt Universal Seconds at 0°F and between 70 and 85 SUS at 210°F. Doesn't help? Well, let's backtrack a little.

All fluids possess a definite resistance to change. This property, a sort of internal friction, is called viscosity. Viscosity is measured in a number of confusing ways. The unit for absolute viscosity in the metric system is the poise or centipoise. In the English system it's called the reyn or microreyn. Divide this absolute viscosity by the density of the fluid and you get something called kinematic viscosity, measured in stokes or centistokes. Kinematic viscosity can also be measured, indirectly, in units of time. In this country this is done using a Saybolt Universal viscometer. This is just a standardized tube with a hole in its bottom. Fill it up with 60 cc of oil and see how long it takes the oil to come out. If it takes 5 minutes, then the viscosity of the oil is 300 Saybolt Universal Seconds. (Incidentally, a very similar instrument was used by the Egyptians as a water clock around 1600 B.C. They used the flow of water through a tube to measure time, whereas we are using time to measure viscosity.) The English use a different viscometer, called the Redwood. Europeans use yet another viscometer, this one called the Engler.

Below are the viscosities, in SUS of the various SAE classes of crankcase oils:

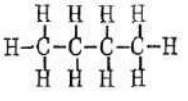
GRADE	0°F	210°F
5W	<4,000	
10W	6,000-12,000	
20W	12,000-48,000	
20		45-58
30		58-70
40		70-85
50		85-110

Note that those classes with a "W" have their viscosities specified at 0°F. Thus SAE 20W20, a multiviscosity oil must satisfy the viscosity requirements of SAE 20W at 0°F and also of SAE 20 at 210°F.

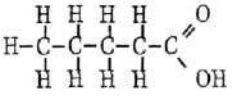
Another important property of oil is how its viscosity changes with temperature. A typical SAE 50 oil has a viscosity of about 60 SUS at 260°F, which increases to about 200,000 SUS at 0°F. In 1929 an arbitrary system was established to evaluate the relationship between viscosity and temperature. This is called the viscosity index (VI) of the oil. Oils with the smallest change of viscosity with temperature were given a VI of 100, and those with the largest change were given a VI of 0. Modern additives and refining techniques have produced oils with VI's much greater than 100. VI additives thicken the oil more at high temperatures than at low. Added to a thin oil such as 10W it can produce a multiviscosity oil like 10W40. These VI improvers work because they're made of huge molecules that behave

differently as the temperature changes.

It has been found that certain lubricants develop tough surface films and can prevent seizure when operating under boundary conditions. This property is called the "oiliness" of the lubricant. Oiliness agents exhibit a very strong affinity for metal surfaces. The oiliness of a lubricant is independent of its viscosity. Water, for example, has appreciable viscosity but practically no oiliness. Mineral oils make poor boundary lubricants. Typical mineral oils are made up of saturated hydrocarbons. They look like this:



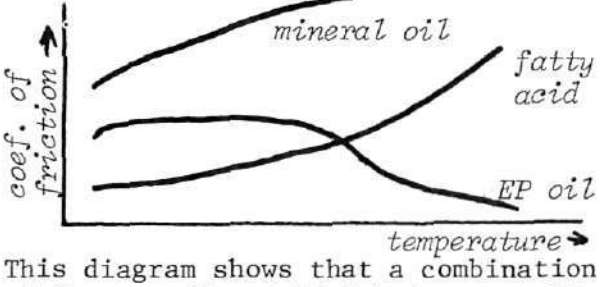
These molecules have little tendency to grab onto metals. However, when small amounts of fatty acids are added to mineral oils, friction values under boundary lubrication drop considerably. These new molecules have an active end:



This active end likes to attach itself to metal surfaces, with the rest of the molecule sticking up. This is what provides the boundary lubrication, since it prevents the two metal surfaces from actually touching. The longer the molecule, the better the boundary lubrication. The addition of fatty acids provides better lubrication only when the nature of the metal surface permits a definite chemical reaction. For non-reactive surfaces such as nickel, chromium, platinum, etc., the fatty acid shows little effect. For metals like copper, cadmium, zinc, magnesium, there is a large effect; for iron and aluminum a lesser effect.

When the surface contact temperature rises above, say, 300°F, the fatty acid will not remain adsorbed to the surface and boundary lubrication fails. This problem arises, for example, in the lubrication of hypoid gears. In these gears the rubbing surfaces are made of very hard steel, and the rubbing speeds are quite high. It was eventually found that lubricants to which certain active chemicals have been added provide satisfactory boundary lubrication. These lubricants are called extreme-pressure (EP) lubricants, although it is really the high sliding velocities and high temperatures that make these lubricants necessary. The hypoid gear was developed for rear axle drives by the Gleason Works in 1925. It permitted lowering the driveshaft and also resulted in quiter operation of the gears in the differential. However, gear lubricants formerly quite satisfactory for spur and bevel gears proved to be inadequate for hypoid gears. Thus the hypoid differential was delayed for about a decade, by which time a suitable class of EP lubricants had been developed.

The active chemicals that have proved to be effective in forming EP lubricants are chlorine, sulphur, phosphorus, and some others. In general, compounds containing these elements are used as additives to form, by reacting with the metal surfaces, chlorides, sulphides, and phosphides. These surface films have a low shear strength, so that rubbing between the contact surfaces occurs in the surface film and thus protects the base metal. These surface films also have a very high melting point (iron sulphide, 2150°F; iron chloride, 1200°F) so that they will remain on the rubbing surfaces even at high contact temperatures. The following shows the effectiveness of three types of lubricants as a function of temperature:



This diagram shows that a combination of fatty acid and EP lubricant would

provide good lubrication throughout the temperature range.

There is a common misconception regarding SAE Viscosity Numbers for transmission and rear axle lubricants. Prior to 1950, SAE Viscosity Numbers for crankcase oils ranged from SAE 10 to SAE 70. The grade numbers for gear lubricants were chosen higher: 75, 80, 90, 140, 250. This does not mean that gear lubricants are more viscous than crankcase oils. The following gives the viscosity, in SUS, of the most common gear lubricants:

GRADE	0°F	210°F
80	15,000-100,000	
90		75-120
140		120-200

Thus SAE 80 gear lubricant has approximately the same viscosity as 30W motor oil.

It should be emphasized that EP lubricants contain active chemicals, and can sometimes do more harm than good if the high reactivity results in excessive chemical corrosion. Thus putting EP oil in a gearbox with brass (an alloy of copper and zinc) synchro rings is likely to be disastrous. BMW's use SAE 80 regular gear lubricant (non-hypoid). Unfortunately, some BMW dealers use SAE 80 EP lubricant, so always check what goes into your gearbox. The American Petroleum Institute has established a system of service classification for transmission and axle lubricants. There are six classifications: GL-1 to GL-6, roughly indicating increasing percentage of EP additives. The only type free from all EP agents is GL-1. This is called "Regular Type Gear Lubricant", and is a straight mineral oil. Any barrel of gear lubricant with a GL number other than GL-1, or with a military spec num-

Drive in the open air in a BMW Cabriolet 2002

ber (e.g. MIL-L-2105B), or with the markings "EP", "hypoid", or "multi-purpose" is the wrong stuff. Here are some brand names that are non-hypoid: Shell Dentax; Quaker State Zero Quadrulube; Esso Gear Oil ST; Castrol Gear Oil ST. If you can't find SAE 80 non-hypoid gear lubricant (this is harder to get than SAE 90), you can get by with 30W non-detergent motor oil. Happy Shifting!

Fred Ipavich

BMW 2002 Suspension

At rest and with standard load, the 2002 front end has about 3° caster, 1/4° negative camber, 1/16" toe-in, 8° steering ("kingpin") inclination and some Ackerman in the steering geometry. The early rear end has about 2° negative camber and a small amount of toe-in.

In motion the front has a substantial amount of camber change, a samll amount of caster change (a form of anti-dive geometry) and a small amount of toe change. The rear has even more camber change and a small amount of bump and rebound toe-in.

All of these facts describe suspension geometry and its effects. Almost all bump and rebound (up and down) motions can be analyzed in terms of three concepts: ride height, roll center height and roll center movement. The resistance of the springs and sway bars to the forces acting between the wheels and the body are described by two other parameters: 1) bump stiffness(also called "wheel rate") and 2) roll stiffness. In the next few issues of der Bayerische, I hope to look at the 2002 suspension in terms of these and other basic suspension concepts and suggest the reasons why some suspension modifications work and others do not.

The early 2002 configuration had a nearly horizontal roll axis - rear roll center a little over 4 inches off the ground and front something over 3 inches off the ground. The camber change pattern was rapid enough to get a camber advantage at large roll angles, i.e., when the body rolls 3°, the camber of the outside tires changes by more than 3°, giving more negative camber relative to the road.

The front roll center is very sensitive to the static length of the McPherson strut and becomes more sensitive as the length is shortened. Front camber however is not very sensitive to strut length. In the rear the situation is reversed - camber changes radically with changes in the effective length of the spring (including pads) and the roll center change is more moderate.

Some simple mods and their effects:

The first is nothing more than a change in setting. In hard cornering, Ackerman geometry (which can be described as steering toe-out) reduces the effectiveness of the inside tire. The reason for this involves weight transfer and the relationship of slip angle to tire loading which we'll get into later. For now let's look at a simple fix for autocrossing and IMSA racing. If you crank in more toe-in than is required for braking stability and good tire wear, you can effectively delay the onset of steering toe-out by 15° or more of steering movement. But 1/4" of toe-in will definitely wear the outside edges of the tires and increase tire drag. So for the street, don't go far beyond 1/8" (measured at the wheel).

Next take a close look at the practice of lowering the front end. The most common method used on late model fours is the removal of the "DOT" spacer between the top of the McPherson strut and the body. Since this was the original 2002 configuration you wouldn't expect many problems, but look at the other changes made to compensate for this simple adjustment of front ride height. First a 9°mm thicker top

rear spring pad and then higher rear tire pressures were specified. What's it all about?

The front spacer raises the body and thus the inboard pickup points for the lower "A-arm" by about 3/4". This raises the front roll center which in turn produces oversteer. Thus the rear had to be raised via the spring pad. Because of the rear camber problem the adjustment had to be smaller and thus did not fully compensate for the oversteer. So more tire pressure was specified to reduce the remaining oversteer. You might ask why not go to a stiffer front sway bar to kill the oversteer? First it would be more expensive, but there is a good engineering reason as well. Remember the camber advantage in roll mentioned earlier. In raising the body, the static point is moved lower on the arc of suspension travel so the wheel has to travel farther to achieve the same amount of camber change.

To some extent the higher roll center is self-compensating since it induces more body roll and thus more wheel movement with the same sway bars.

A stiffer sway bar would inhibit wheel travel and turn a marginal camber difference into a real problem. Control of wheel of travel is about the only good engineering reason for adding roll stiffness and for basically stock BMW's on standard tires the optimum settings are pretty soft.

Next month we'll look at ways to tame the cut spring monster, how and why camber plates work and some steering geometry games (Ackerman and bump-steer).

Jerry Coffey

Pylon Propaganda

Current autocross "Team Championship" point standings.

1. AJSTC	273	- Total points as of
2. PCA	268	10 championship
3. CCI	258	autocrosses
4. SCCA	234	
5. SCNCA	231	
6. BMWCCA	177	
7. MASE	140	
8. TAA	128	
9. MDSCC	99	
10. ACTC	94	
11. WRC	93	
12. UMSCC	92	
13. CCB	73	
14. SESCA	70	
15. MGCC	53	
16. MCMC	42	
17. Lotus	35	
18. JHH	13	

Championship points NCC-BMWCCA active autocrossers.

Name	Points	Class
Chet Kingsbury	76	C stock
Harry Bacas	76	C stock
Ivars Mellups	45	B mod.
John Stavar	36	E prep.
Susan Mellups	27	B mod.
Dave Toy	20	C stock
Ric Cavallero	19	A prep.
Chris Romine	9	C stock
Betty Kingsbury	4	L/B
Rick Price	0	A prep.
Paul MacInnis	0	E prep.

Chet Kingsbury

TECH. SESSION

On September 29, 1973 there will be a tech session for BMWCCA members at Heishman BMW in Arlington, Va. We will have the complete facilities (i.e., Parts dept., mechanics, etc.) from 9 A.M. until approximately 4 P.M. The tech session will be held rain or shine. Any questions concerning the tech session should be directed to Ric Cavallero at 871-1131 or Ed Alber 527-6879. See you there.

Trading Post

FOR SALE:

1 set of A-70 13 Firestone Wide Oval tires (great for autocrossing) just scrubbed in, on BMW rims. 1 '72 legal roll bar, very strong, crash tested; with grade 8 mounting hardware and padding, plus other stuff. Also dune buggy parts, chassis, engine, etc. Call Dave Toy at 460-0130 (home) or 871-2883 (office)

Lots of miscellaneous BMW parts for a 2002. Call Terry Baker at 434-8397.

WANTED:

A recent factory shop manual, and a stock 2002 differential. Call Dave Toy at 460-0130 (home) or 871-2883 (office).

(Everybody has Dave's number now, right?)

Etc.

Today sedan racing, tomorrow the world. Not content with its 2002's race record to date, BMW is starting limited production of turbocharged models that will boost the power to 190hp from 120. The production run will be just enough to get the model homologated.

from Autoweek

New Members Party

In an effort to have new (and old) members get aquainted we have planned a get together party on October 6th for this purpose. The party is absolutely free. Food and beer will be supplied by the club. Bring your own hard stuff.

It is important that you RSVP by Sept. 30 so purchases can be made. O.D. is Patti Cavallero . . . . call 871-1131 and tell her you'll be there. This is for all members.

Date: October 6, 1973
Time: 8:00 p.m.
Place: 4300 Parkland Ct.,Rockville,Md.
Directions: Cap. Btwy. (Rt. 495), North on Georgia Ave. (Rt.97), left at Aspen Hill Rd. (approx. 5 miles from 495), right at 2nd traffic light (Parkland Dr.) fourth right on Parkland Ct.

Frantic Fall Tour I

So you liked the Scenic Spring Tour? Well, we now have the Frantic Fall Tour. This will be similar to out annual spring outing with a comfortable drive to a particular point and then back the quickest way possible. This tour will take us to Harrisburg, Pa., To view Automobilorama, America's rarest collection of antique, vintage, and classic cars. There are over 250 examples to be seen plus other oddities such as conestoga wagons, motorcycles, etc. You can view such cars as a 1912 Bugatti, 1933 Auburn Speedster, 1923 Rolls Royce, 1923 Moon, 1898 Malden Steamer, 1912 Fiat, 1906 Reo truck, and scads of others. Also, the tour up will take us through Gettysburg Civil War Park.

O.D.: Ric Cavallero 871-1131
Date: Oct. 27, 1973
Time: 8:30 a.m.
Departure from the front of the Hecht Co. in Montgomery Mall shopping center on Democracy Blvd., Bethesda, Md.
Cost: Free, except for gas and price of museum tour of $1.00 (half price).

NATIONAL CAPITAL CHAPTER

P. O. BOX 2413
HYATTSVILLE, MD.
20784

First Class

ROCKVILLE, MD SEP 14 PM

Ernie Pyle Journalist USA 16c

RIBLETT, WILLIAM R. JR.
11736 CHERRY GROVE DR.
GAITHERSBURG, MD. 20760

Old but New

September issue of Car and Driver has a great article on two mid-thirties BMW's. They are the 319/1 and 327. To quote Car and Driver...they are classics now because they were so far ahead of everyone else forty years ago...

N.C.C. Calender

Sept. 15 - IMSA Camel 200 races at Lime Rock, Conn.
18 - BMWCCA meeting
29 - BMWCCA Tech session
30 - MCC Cherished Date Rally
Oct. 2 - BMWCCA Executive meeting
2 - Bayerische deadline
6 - BMWCCA new members' party
7 - BRANDED Cherished Date Rally
14 - Lotus open Autox.
16 - BMWCCA meeting
19 - 21 - Oktoberfest, Atlantic City, N.J.
21 - PCA Autumn Color Champ. Rally
27 - BMWCCA Frantic Fall Tour
28 - SCNCA champ. autox.

Next Meeting

Our next meeting is on Tuesday, September 18, 8:00 p.m. at the Brood Farm Restaurant in Chevy Chase, Md. The program will be a talk on rust prevention and body repair by Bob Dreyer from Modern Body Shop.